What is claimed is:

1. A radiosurgery x-ray system, comprising:

an x-ray source having an emission head at a distal end of an arm assembly extending from a base unit, said head being adapted for selectively emitting an x-ray beam along a beam axis, and including an associated controller for selectively orienting said head whereby said beam extends along a succession of treatment axes; and

a collision avoidance subsystem comprising means for preventing said head and arm assembly from effecting a collision with an object in one or more predetermined exclusion zones.

2. A system according to claim 1, wherein said controller is responsive to observation by said collision avoidance subsystem of an object extending through at least one of said exclusion zones, to interrupt motion of said head toward said at least one exclusion zone.

3. A system according to claim 1, wherein said controller is responsive to observation by said collision avoidance subsystem of an object extending through at least one of said exclusion zones, to slow down motion of said head toward said at least one exclusion zone.

4. A system according to claim 1 wherein said controller is responsive to a user action to be taken in response to observation of an object extending through said exclusion zone, to interrupt motion of said head toward said exclusion zone.

5. A system according to claim 1, wherein said collision avoidance subsystem comprises one or more light sources effective to establish a substantially planar light beam between at least one of said exclusion zones and said emission head, and wherein said controller is responsive to an object extending through said light beam, to interrupt motion of said head toward said at least one exclusion zone.

6. A system according to claim 4, wherein said planar light beam is effective to establish a barrier that defines at least in part said exclusion zone.

7. A system according to claim 6, wherein said barrier is a movable barrier.

8. A system according to claim 1, wherein said collision avoidance subsystem comprises one or more light sources effective to establish a substantially planar light beam between at least one of said exclusion zones and said emission head, and wherein said controller is responsive to a user action to be taken in response to observation of an object extending through said light beam, to interrupt motion of said head toward said at least one exclusion zone.

9. A system according to claim 5 wherein said one or more light sources are fixedly positioned with respect to said base unit.

10. A system according to claim 5 wherein said planar light beam is fan-shaped and extends from said one or more light sources.

11. A system according to claim 5 wherein said one or more light sources comprise at least one of a laser and an LED.

12. A system according to claim 5 wherein said one or more light sources are fixedly positioned with respect to said head and selectively establishes a light beam along a light axis, and said controller is selectively operative to drive said head whereby said light axis is swept to effect said planar pattern light beam.

13. A system according to claim 1 wherein said collision avoidance subsystem comprises:

an array of acoustic transducers fixedly coupled to said x-ray source, wherein each of said transducers transmits a succession of acoustic pulses along a transmission axis extending from said x-ray source, and detects acoustic energy back-scattered along said light axis from an object disposed along said light axis, and wherein said beam axes are mutually aligned whereby a cross-section of adjacent pairs of said pulses transverse to said transmission axis is contiguous at a predetermined distance from said x-ray source; and

means for determining from said received back-scattered acoustic energy the distance between said x-ray source and said object, and in response to said determined distance being at or less than a predetermined value, interrupting motion of said head toward at least one of said exclusion zones.

14. A system according to claim 13 wherein said array of acoustic transducers are attached to said emission head of said x-ray source.

15. A system according to claim 13 wherein said array of acoustic transducers form sense cones.

16. A system according to claim 1 wherein said collision avoidance subsystem comprises:

a sensor disposed on one of said arm and said emission head, said sensor being operative to generate an alarm signal upon impact of said sensor with an object during motion of said arm and/or head; and

means responsive to said alarm signal to interrupt motion of said arm and/or head.

17. A system in accordance with claim 16, wherein said sensor comprises at least one of: a tactile sensor; an infrared sensor; and a capacitance sensor.

18. A system according to claim 16 wherein said sensor is a tactile sensor, and comprises a fluid filled bladder and a pressure transducer coupled to the bladder for generating said alarm signal when fluid pressure in said bladder exceeds a predetermined threshold.

19. A radiosurgery system according to claim 5, wherein said one or more light sources form a linear array of light sources.

20. A radiosurgery and/or radiotherapy x-ray system, comprising:

an x-ray source having an emission head at a distal end of an articulated arm assembly extending from a base unit, said head being adapted for selectively emitting an x-ray beam along a beam axis, and including an associated controller for selectively orienting said head whereby said x-ray beam extends along a succession of treatment axes in a patient zone; and

a collision avoidance subsystem comprising means for preventing said head from entering one or more predetermined exclusion zones.

21. A system according to claim 20, wherein said controller is responsive to observation by said collision avoidance subsystem of said x-ray head extending within a predetermined distance from at least one of said exclusion zones, to prevent said head from entering said at least one exclusion zone.

22. A system according to claim 20, wherein said controller is responsive to a user action to be taken in response to observation of said x-ray head extending within a predetermined distance from at least one of said exclusion zones, to prevent said head from entering said at least one exclusion zone.

23. A system according to claim 20, wherein said collision avoidance subsystem comprises one or more light sources effective to establish a substantially planar light beam between at least one of said exclusion zones and said emission head.

24. A system according to claim 23, wherein said planar light beam is effective to establish a barrier that defines at least in part said exclusion zone.

25. A system according to claim 24, wherein said barrier is a movable barrier.

26. A system according to claim 23 wherein said one or more light sources are fixedly positioned with respect to said base unit.

27. A system according to claim 23 wherein said planar light beam is fan-shaped and extends from said one or more light sources.

28. A system according to claim 23 wherein said one or more light sources comprise at least one of a laser and an LED.

29. A system according to claim 23 wherein said one or more light sources are fixedly positioned with respect to said head and selectively establishes a light beam along a light axis, and said controller is selectively operative to drive said head whereby said light axis is swept to effect said planar pattern light beam.

30. A system according to claim 20 wherein said collision avoidance subsystem comprises an array of acoustic transducers fixedly coupled to said x-ray source.

31. A system according to claim 5, further comprising a photodetector for detecting light from said planar light beam that is back-scattered from said object.

32. A system according to claim 1, wherein said collision avoidance subsystem comprises a laser rangefinder for detecting the presence and location of said object in said one or more exclusion zones, and wherein said laser rangefinder includes:

A. a transmitter for generating laser light and transmitting the laser light toward at least one of said exclusion zones;

B. a receiver for receiving laser light that is generated by said transmitter and that is back-scattered from said object;

C. a photodetector for detecting the intensity of the light received by the receiver; and

D. a data acquisition system effective to compute the distance to said object by measuring the time required for said laser light to reach said object and return to said transmitter.

33. A system according to claim 32, wherein said photodetector comprises a photomultiplier tube.

34. A system according to claim 1, wherein said collision avoidance subsystem comprises a laser rangefinder for detecting the presence and location of said object in said one or more exclusion zones, and wherein said laser rangefinder includes:

A. means for generating laser light and transmitting the laser light toward at least one of said exclusion zones;

B. means for receiving laser light that is generated by said transmitter and that is back-scattered from said object;

C. means for detecting the intensity of the light received by the receiver; and

D. means for measuring the time required for said laser light to reach said object and return to said transmitter, thereby determining the distance to said object.